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91532



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Mana Tohu Mātauranga o Aotearoa  
New Zealand Qualifications Authority

## Level 3 Agricultural and Horticultural Science 2023

### 91532 Analyse a New Zealand primary production environmental issue

Credits: Five

Achievement	Achievement with Merit	Achievement with Excellence
Analyse a New Zealand primary production environmental issue.	Critically analyse a New Zealand primary production environmental issue.	Comprehensively analyse a New Zealand primary production environmental issue.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

**You should attempt ALL parts of the task in this booklet.**

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–11 in the correct order and that none of these pages is blank.

Do not write in any cross-hatched area (DO NOT WRITE). This area will be cut off when the booklet is marked.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.**

**Achievement**

**TOTAL 04**

**INSTRUCTIONS**

Carefully read ALL the instructions and parts before answering.

You must answer the different parts using one primary product.

Name your specific primary product:

Primary product: dairy farming

**STIMULUS MATERIAL**

New Zealand's greenhouse gas emissions.



Source: (adapted) <https://www.sciencemediacentre.co.nz/2010/07/01/emissions-trading-scheme-launched/>

### PLANNING

- 98kg methane emission produced by the average dairy cow yearly
- NZ must reduce emission by 30% below 2005 levels by 2030
- almost all emissions are from ~~dair~~ agriculture
- 23-5% of this is methane and nitrous oxide
- methane is released by cows burping, it is a ruminant or by-product of digestion
- nutrient rich grass contains nitrogen a small percent is used for meat and milk production the rest is excreted through feces/dung and urine.
- special feed to reduce carbon emissions
- planting trees/reduce carbon from fossil fuels etc
- special breeding / smaller herds etc machinery.

**TASK: How the agricultural and horticultural sector is responding to New Zealand's greenhouse gas emissions**

- (a) How are greenhouse gases emitted in the production of your chosen primary product?

Use recent data (preferably from within the last five years) and other evidence to support your answer.

~~In Dairy farming the~~ Almost 50% of New Zealand's greenhouse gas emissions are from agriculture a large percentage of this is from dairy farming. 23.5% out of the 47% of ~~emmi~~ emissions are methane and nitrous oxide. Nutrient rich grass cows graze on contains high levels of nitrogen. only a small percent of this nitrogen is used in the production of milk and meat in a cow, the rest is released into the air through urine and dung. Cows are ruminant animals meaning through digestion more methane is produced. The methane is also released into the atmosphere by natural processes such as burping. The average dairy cow produces 98kgs of methane annually. This is very high considering how many dairy cows in New Zealand. Unfortunately methane and nitrous oxide are not the only green house gases emitted during milk production. Though levels emitted arent as high as the previous two gases carbon dioxide is produced through fossil fuels. In the dairy industry this is through the transportation of milk from farms in trucks, machinery used in paddocks and possibly through milk factories. All the green house gases involved in dairy farming rise into the atmosphere forming

a blanket warming the earth and increasing temperatures.



- (b) What steps are the New Zealand Government and industry taking to reduce the greenhouse gases emitted from the production of your primary product?

Use recent data (preferably from within the last five years) and other evidence to support your answer.

Globally many countries saw the rising levels of green house gas emissions and the negative affects. In 2016 the countries in the United Nations formed an agreement known as the PARIS agreement to reduce global greenhouse gas emissions. As Newzealand is part of the United Nations Framework convention (UNFc) regulations were set to reduce emissions. NZ's role in the agreement ~~to~~ is to reduce green house gas emissions by 30% ~~so levels would be lower than in 2005.~~ below levels in 2005 by 2030. The New Zealand goverment has increased tax for milk producers as it is contributing to help fund research for climate change plans and equitment. Farmers individually are also becoming more aware of their farms emissions as they must help meet the countries requirements by 2030. Farmers are making changes to their farms to help reduce emission such as, breeding for lower emission cattle, buying feed which reduces nitrogen emissions, planting trees and buying equitment which helps track greenhouse gas levels.

- (c) (i) What specific courses of action can be taken by **the producer** to reduce the greenhouse gases emitted in the production of the primary product?

Course of action (1): planting trees to reduce carbon

A popular and simple way is planting trees, this is the least expensive and complex course of action to help the farmer obtain sustainable production. Planting trees helps balance and reduce carbon dioxide levels emitted through fossil fuels. The trees take in the carbon stores it and releases oxygen back into the atmosphere through natural processes.

Course of action (2): using feed easier to digest

special <sup>dry</sup> feeds can be brought and given to cows instead of nutrient grass. Because the feed is made in a more simple form cows can digest it easier producing less nitrogen, preventing such high levels of nitrous oxide being released into the atmosphere.

- (ii) Justify the course of action that has the most significant impact in reducing greenhouse gas emissions, allowing for sustainable production of your primary product.

You should consider environmental, social, economic, and political impacts.

Use recent data (preferably from within the last five years) and other evidence to support your answer.

Planting trees is a economically friendly course of action compared to the use of special dry feed for the cows. However, in dairy farming nitrous oxide and methane levels are more of a concern than carbon dioxide. 23.5% of agricultural emissions are nitrous oxide and methane which shows they are more of a concern for farmers. Economically buying these specific dry feeds are going to cost farmers and potentially affect lower decile communities if people and dairy farmers are already struggling. However cost seems to be the only negative aspect to special feeds as a course of action. Politically it is effective therefore ~~meets~~ will help meet regulations put in place to reduce NZ's emissions. This course of action also has no affect on the environment in other aspects which is important. Though the change of feed is costly for farmers it is also effective <sup>and significant</sup> in helping reduce emissions and preventing climate change. Dairy farmers ~~and~~ /industry must see the bigger picture as its only a small cost for big positive enviromental impact. By making farmig a sustainable production the world and land is protected and preserved for generations to come.



Lastly this course of action has no social impacts which is important for people and communities to work together. The action is simple and only affects the cow as they consume the feed.

## Achievement

**Subject:** Agricultural and Horticultural Science

**Standard:** 91532

**Total score:** 04

Q	Grade score	Marker commentary
One	A4	The candidate has used some detail when explaining how greenhouse gases (GHG) are emitted in the production of dairy products. They wrote in some detail on the steps that the New Zealand government is taking to reduce GHG emissions. There is little detail of how the courses of action will help reduce greenhouse gas emissions.